

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

--	--	--	--	--	--	--	--	--	--

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016 SESSION

TDA2411 – DIGITAL AUDIO AND SPEECH PROGRAMMING

(All sections / Groups)

8th March 2016
9.00 A.M.-11.00 A.M.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 3 pages with 5 Questions only.
2. Attempt **FOUR** out of FIVE questions. All questions carry equal marks and the distribution of the marks for each question is given. If you answer all FIVE questions, only the first **FOUR** will be marked.
3. Please print all your answers in the answer booklet provided.

Question 1

- a) Fill in the blanks in each of the following statements related to Wheatstone's speaking machine.

[4 marks]

- i. The _____ was manipulated by the operator to try to copy the acoustic configuration of the vocal tract during sonorant sounds.
- ii. The bellows provided the _____.
- iii. The vibrating reed produced the _____.
- iv. The various small whistles and levers controlled most of the _____.

- b) Given the syllables for the word 'Exercise' below, identify all the phonemes and diphones in the word.

[3 marks]

Word : Exercise
Syllables : EX, ER, CISE
Diphones :
Phonemes :

- c) List the TWO types of information contained in Voice part of Channel message in a MIDI file. Briefly describe each of them with appropriate examples.

[3 marks]

Question 2

- a) Explain the THREE main types of speech synthesis techniques.

[3 marks]

- b) The reliability of a speech recognizer is most often defined by its recognition accuracy. Describe the THREE types of speech recognition errors that can decrease recognition accuracy.

[3 marks]

- c) Draw and label a diagram to describe template matching technique for speech recognition.

[4 marks]

Question 3

- a) Differentiate Audio Compression against Audio Expansion in dynamics processing context. Provide a diagram for each method to illustrate the difference. [4 marks]
- b) With suitable diagrams, explain how low-pass, high-pass and band-pass filters work. [6 marks]

Question 4

- a) What does Nyquist Theorem specify and what is Nyquist frequency? [2 marks]
- b) If an audio is sampled at 6 kHz, calculate the aliasing frequency if the input signal has a frequency of: [2 marks]
- i. 3 kHz
 - ii. 8 kHz
- c) Define 'grammar' in speech recognition context and explain why it is necessary. [2 marks]
- d) Ring modulation is one of the frequency-changing effects that can be applied to audio signals. Explain how ring modulation is performed by describing the input and output of the method using a diagram. [4 marks]

Question 5

a) Explain the following terms in CSound context:

[3 marks]

- i. sr
- ii. kr
- iii. ksmps

b) List and briefly describe FOUR basic components of a basic perpetual coder.

[4 marks]

c) Describe the structure of a basic WAVE file with a diagram.

[3 marks]